

**What is Claimed is:**

- 1 1. A method for detecting an endpoint of a chemical mechanical polishing (CMP)  
2 process comprising:  
3 (a) setting up at least one carrier for fixing a wafer comprised of a plurality of  
4 material layers to a surface of a polishing pad;  
5 (b) rotating the wafer and the polishing pad with respect to each other, and causing  
6 the wafer to move from a first portion of the polishing pad to a second portion;  
7 (c) measuring one environmental temperature by a measuring device;  
8 (d) measuring one temperature of the portion of the polishing pad by the measuring  
9 device;  
10 (e) calculating a temperature difference between the temperature in step (c)-(d);  
11 (f) repeating step(b)-(e),and making a curve which includes a first constant value  
12 slope, a non-constant value slope, a second constant value slope; and  
13 (g) determining an endpoint of the CMP process by a turning point between the first  
14 constant value slope and the second constant value slope.
- 1 2. The method of claim 1, wherein in said step (c)-(d) the measuring device is a single  
2 point temperature measuring device.
- 1 3. The method of claim 1, wherein in said step (c)-(d) the measuring device is a thermal  
2 image camera.
- 1 4. The method of claim 2, wherein said single point temperature measuring device is an  
2 infrared detection device.
- 1 5. The method of claim 1, wherein in said step (c) the environmental temperature at the

2       central portion of the polishing pad.

1       6. The method of claim 1, wherein in said step (c) the environmental temperature at the  
2       edge portion of the polishing pad.

3       7. The method of claim 1, wherein in said step (c) the environmental temperature at any  
4       portion of the CMP apparatus in addition to the rotary polishing platen.

1       8. The method of claim 1, wherein in said step (c) the environmental temperature at any  
2       portion of the stable temperature in the environment.

1       9. The method of claim 1, wherein said step (c)-(g) use an operation device.

1       10. The method of claim 9, wherein said operation device is built-in the measuring device  
2       or linked.

1       11. The method of claim 9, wherein said operation device is linked to a computer.

1       12. The method of claim 1, wherein said step (f) uses a numerical method.

1       13. The method of claim 12, wherein said numerical method is the least square method or  
2       other linear regression methods.

1       14. The method of claim 12, wherein said numerical method is linear regression methods.

1       15. The method of claim 1, wherein in said step (f) the first constant value slope and the  
2       second constant value slope is in a predetermined variation.

1       16. The method of claim 15, wherein said predetermined variation is within five percent.